SITE INVESTIGATION REPORT

PREPARED FOR:

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HERCULES, INC.

CHEMICAL SPECIALTIES

HATTIESBURG, MISSISSIPPI

APRIL, 2003

PREPARED BY:

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TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

Eco-Systems, Inc (Eco-Systems) has been retained by Hercules, Incorporated (Hercules) to conduct site investigations at the Hercules plant in Hattiesburg, Mississippi. The site location is shown on Figure 1. This report documents site investigations conducted in accordance with *Hercules' Site Investigation Work Plan* (Eco-Systems, February 1999) and additional comments of the Mississippi Department of Environmental Quality (MDEQ) approval letter dated April 5, 1999, as amended.

The work described in the approved work plan centered on efforts to determine whether Dioxathion, the miticide contained in Delnav, was present in site soil and groundwater. The work plan included installation of piezometers, monitoring wells, and staff gauges to provide hydrogeologic and groundwater quality information near the former Dioxathion production area and near former wastewater sludge pits. These monitoring wells supplemented the previously existing monitoring wells at the site. Monitoring well and piezometer locations are shown on Figure 2. The original staff gauges were washed out, or otherwise destroyed, between the time of their installation and the present. However, new staff gauges were installed in Green's Creek on March 4, 2003, and an elevation survey was conducted on March 5, 2003 to link the staff gauge elevations to the monitoring well and piezometer elevations.

Installation of the temporary piezometers was conducted in April/May 1999. Installation of monitoring wells was conducted in February 2000. However, prior to sampling the additional monitoring wells, questions arose regarding analytical methods for Dioxathion and the quality of Dioxathion for use as a laboratory standard. In the ensuing months, Hercules, in conjunction with MDEQ's consultant, Mississippi State University (MSU) developed analytical protocols for soil and groundwater (Appendix A). Since the quality of available analytical standards was questionable, Hercules contracted with Sigma-Aldrich Chemicals to synthesize Dioxathion standards. In August 2002 Dioxathion had been manufactured of a suitable quality to be used as laboratory standard, and Hercules and the MDEQ had agreed to a laboratory protocol. In October 2002, groundwater samples were collected from four selected wells, and those samples were analyzed by Bonner Analytical and Testing Company (BATCO) and the Mississippi State Chemical Laboratory (MSCL) to test the newly established laboratory protocol. The methods and results of protocol sample collection and analysis are discussed in this report.

On December 4 and 5, 2002, groundwater samples were collected from the eleven site monitoring wells, and those samples were analyzed for Dioxathion. At the request of the MDEQ, samples from the wells installed in 2000 (MW-7 through MW-11) were also analyzed for volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC). Hercules submitted the results of the December 2002 sampling event to the MDEQ in the *Interim Groundwater Monitoring Report* (Eco-Systems, January 2003). In the *Interim Groundwater Monitoring Report*, Hercules recommended that, prior to conducting a full mobilization to

2.0 SITE CONDITIONS

2.1 FACILITY LOCATION AND SITE DESCRIPTION

The Hercules facility is located on approximately 200 acres of land north of West Seventh Street in Hattiesburg, Forrest County, Mississippi. More specifically, the Site is located in Sections 4 and 5, Township 4 North, Range 13 West, just north of Hattiesburg, Mississippi (Figure 1). The facility has been in operation since 1923. The facility is bordered to the north by Highway 43 and Illinois-Central & Gulf Railroad, along with various residential and commercial properties. The southern property boundary is bordered by 7th Avenue; and by a cemetery and Zeon Chemical Company to the southwest. Across from these locations are residential areas. The eastern and western boundaries are bordered by sparsely populated residential areas.

The facility's historical operations consisted of wood grinding, shredding extraction, fractionation, refining, distillation, and processing of rosin from pine tree stumps. Historically, over 250 products were produced from the above-referenced operations and included: modified resins, polyamides, ketene dimer, crude tall oil wax emulsions, synthetic rubber, and Delnav, an agricultural miticide. Structures at the facility include offices, laboratory, powerhouse, production buildings, wastewater treatment plant, settling ponds, landfills, and central loading and packaging areas.

2.2 TOPOGRAPHY AND SURFACE DRAINAGE

Surface water drainage patterns at the Site conform generally to the topography which slopes toward Green's Creek from either side (Figure 2). Topography slopes generally to the south in the Wastewater Sludge Disposal Area, and to the north/northwest in the Former Industrial Landfill Area and the Former Delnav Production Area. A topographic divide located south/southwest of the Former Delnav Production Area separates north flowing surface water drainage to more east/southeast-trending drainage. The east trending, perennial stream Green's Creek and its natural and man-made tributaries are the main surface drainage features in the area. Green's Creek leaves the Site at its northeast corner and subsequently runs into Bowie River, located approximately one (1) mile to the north/northeast.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

According to the Mississippi State Geological Survey Bulletin Number 44, Forrest County Mineral Resources (Foster, 1941), the site is located within the Pine Hills physiographic region of the Coastal Plain physiographic province. The topography if the region is characterized by a maturely dissected plain which slopes generally to the southeast. The topography is dominated by the valleys of the Bowie and Leaf Rivers coupled with the nearly flat or gently rolling bordering terrace uplands.

In the boring for piezometer TP-13, which is adjacent to Green's Creek, the top of the stiff clay was encountered at an approximate depth of 10 feet below ground surface. This is approximately the depth of the creek bottom at staff gauge SG-3, which is located immediately south of piezometer TP-13. The clay formation encountered in site borings and observed in the bottom of Green's Creek may serve as a confining unit for groundwater in the uppermost saturated interval. Copies of boring logs and construction diagrams for piezometers and monitoring wells installed during this investigation are included in Appendix B. A geologic cross section of the site is shown on Figure 4.

Water level information was collected from monitoring wells MW-1 through MW-6, the 14 piezometers, and the four (4) staff gauges on March 5, 2003. Based on the surveyed elevations of the wells, piezometers, and staff gauges, water level elevations were calculated. A summary of the water level information data is provided in Table 1. Based on the water level information, a potentiometric surface map has been prepared for the uppermost saturated interval and Green's Creek. The potentiometric surface map is shown on Figure 5.

Groundwater in the uppermost, saturated interval beneath the site tends to mimic surface topography. In the active portions of the plant operations, which are located in the southeastern portion of the site, the potentiometric surface indicates the presence of a southwest to northeastward trending divide. The potentiometric surface map indicates that groundwater located to the northwest of the divide would tend to move northwestward towards Green's Creek. Likewise, groundwater southeast of the divide would tend to move southeastward. On the north side of Green's Creek, the potentiometric surface indicates that groundwater in the uppermost, saturated interval moves generally southward towards Green's Creek.

Surface water enters the site on the west side of the property via Green's Creek. Green's Creek flows towards the east in the northern portion of the property. Elevations of the stream surface are significantly lower than the groundwater. This indicates that, while groundwater may contribute to flow in Green's Creek, hydraulic connection between the uppermost saturated interval and Green's Creek is retarded. The retardation of the water moving from the sand to the creek is likely due to silt and clay in the sand adjacent to the creek.

3.2 GROUNDWATER MONITORING

Groundwater sample collection (Protocol, December 2002, and February 2003) was conducted in accordance with the work plan and the EPA Region IV's Standard Operating Procedures and Quality Assurance Manual (November 2001). Groundwater samples were collected using a peristaltic pump and Teflon® tubing. Low flow/low stress sampling techniques were utilized for wells where there was sufficient recharge. If there was insufficient recharge for low flow/low stress sampling techniques to be utilized, traditional volume-based sampling techniques were used. Copies of the sample collection logs for both the protocol sampling and the groundwater monitoring are included in Appendix C.

Groundwater samples were collected directly from the discharge tubing into containers provided by BATCO. A BATCO representative was on site during sample collection and samples to be analyzed by BATCO were delivered directly to the BATCO site representative. Chain-of-custody documentation was maintained for all samples collected.

3.2.1 Protocol Sampling

Prior to sampling the additional monitoring wells, surface water and stream sediment, questions arose regarding analytical methods for Dioxathion and the quality of Dioxathion for use as a laboratory standard. In the ensuing months, Hercules, in conjunction with MDEQ's consultant, Mississippi State University (MSU) developed analytical protocols for soil and groundwater (Appendix A). Since the quality of available analytical standards was questionable, Hercules contracted with Sigma Aldritch to synthesize Dioxathion standards. In August 2002 Dioxathion had been manufactured of a suitable quality to be used as laboratory standard, and Hercules and the MDEQ had agreed to a laboratory protocol.

Groundwater samples were collected to evaluate the Dioxathion analytical protocol on October 14, 2002 from the selected monitoring wells MW-1, MW-4, and MW-5. Quality assurance/ quality control (QA/QC) samples were also collected. The QA/QC samples included a rinsate blank and a duplicate sample for MW-4. All samples were analyzed for Dioxathion by both BATCO and the Mississippi State Chemical Laboratory (MSCL). At the request of the MDEQ, samples were also collected from monitoring wells MW-5 and MW-6 for VOC and SVOC analyses. Samples submitted for VOC and SVOC analysis were analyzed by BATCO. Representatives of the MDEQ were on site during protocol sample collection but did not elect to split samples.

During the protocol sampling an equipment rinsate blank, a matrix spike sample (MS) and a matrix spike duplicate (MSD) sample were collected to provide quality assurance and quality control (QA/QC) during the protocol sampling. A trip blank, which remained in the sample cooler, was also provided by BATCO. The rinsate blank sample was collected by pouring deionized water over, and through a piece of disposable tubing and collecting the rinsate in a sample container. MS and MSD samples were collected by alternating aliquots into the containers for the monitoring well sample, the MS sample and MSD sample.

Surface water was collected from Green's Creek by submerging the sample container into the flow of the creek to a depth sufficient to fill the containers. Samples were collected beginning downstream and working upstream to mitigate the potential for cross-contamination related disturbed materials from drifting downstream to subsequent sampling locations. Sample location CM-5 is located downstream from the other four locations and was therefore sampled first. Sample collection progressed in an upstream manner beginning with CM-5. To prevent disturbed particles from entering the sample containers, the samples were taken upstream of the sampler. Surface water was placed into containers provided by BATCO and delivered to the BATCO site representative for laboratory analysis.

Stream sediment was sampled in a sequence identical to the surface water collection. Sediments to be analyzed for Dioxathion were collected using a stainless steel spade. The spade was decontaminated prior to use and between each sample collection. Sediments to be analyzed for VOC were collected using sampling syringes provided by BATCO. Each syringe was used only once. Sediments were placed into containers provided by BATCO and delivered to the BATCO site representative for laboratory analysis.

During the surface water and stream sediment sampling an equipment rinsate blank, a field duplicate sample of surface water, and a field duplicate sample of stream sediment were collected to provide QA/QC during the surface water and stream sediment sampling. A trip blank, which remained in the sample cooler, was also provided by BATCO. The rinsate blank sample was collected by pouring deionized water over the stainless steel scoops used to collect the stream sediment samples and collecting the rinsate in a sample container. The field duplicate sample of the surface water and the duplicate sample collected for the MDEQ were collected in the same manner as the original sample and collected from the same location. The field duplicate sample of the stream sediment sample and the duplicate sample collected for the MDEQ were collected by obtaining additional stream sediments from the same location as the original sample.

3.4 DECONTAMINATION

Drilling equipment used to collect subsurface soil and groundwater samples (drill rods, hydraulic probe rods, and samplers, screens points (stainless and PVC)) were decontaminated initially by high-pressure steam cleaning. Decontamination between sampling intervals was also performed to mitigate vertical cross-contamination between sample intervals/locations. For stainless-steel sampling equipment specifically used for collecting soil samples (e.g., trowels, bowls, etc.), decontamination will be accomplished by the following procedure:

1) Phosphate-free detergent wash.
2) Potable water rinse.
3) Deionized water rinse.
4) Isopropanol rinse.
5) Organic-free water rinse or air dry.
6) Individual tin foil wrap.

4.0 LABORATORY ANALYTICAL RESULTS

Samples were analyzed for Dioxathion according to the analytical protocol established by Hercules and approved by the MDEQ. Samples submitted for VOC and SVOC analysis were analyzed according to U.S. EPA SW-846 methods 8260B for volatile compounds and 8270C for semi-volatile compounds, respectively. Analytical data are discussed below and summarized in Tables 2, 3, 4, 5, and 6. Copies of the laboratory analytical reports are included in Appendix D. Sample locations are shown on Figure 2.

The following sections are intended to provide a brief overview of the laboratory analytical results, and not an exhaustive discussion of the analytical data.

4.1 PROTOCOL SAMPLING

Samples collected for evaluation of the Dioxathion protocol were analyzed for cis-Dioxathion, trans-Dioxathion, and Dioxenethion. Analysis of the protocol samples by the MSCL was conducted by both high performance liquid chromatography/mass spectrometry (HPLC/MS) methods and ultraviolet (HPLC/UV) methods. Analysis of the protocol samples by BATCO was conducted by Gas Chromatography/Mass Spectrometry (GC/MS). The results of the Dioxathion analyses are shown in Table 2. Based on the agreement between Hercules and the MDEQ, the samples collected in this investigation were analyzed by GC/MS methods.

Groundwater samples were also collected in October 2002 for monitoring wells MW-5 and MW-6 for VOC and SVOC analysis. No detections of VOC or SVOC were identified above the MDL as reported in the case narrative by Bonner (Appendix D).

4.2 DECEMBER 2002 GROUNDWATER MONITORING

Samples collected during the December 2002 groundwater monitoring event were analyzed using GC/MS methods by BATCO. Analytical results are shown in Table 3. Concentrations of cis-Dioxathion were detected in the groundwater samples collected from monitoring wells MW-4 and MW-9. Concentrations of trans-Dioxathion were detected in the groundwater sample collected from monitoring well MW-8. Concentrations of total Dioxathion (i.e. the sum of the concentrations of cis-Dioxathion and trans-Dioxathion) above the target remediation goal (TRG) of 54.8 parts per billion (ppb) were not detected in the groundwater samples collected from the site. The TRGs are found in the Tier 1 Target Remedial Goal Table of the Final Regulations Governing Brownfields Voluntary Cleanup And Redevelopment In Mississippi, published by the Mississippi Commission on Environmental Quality and adopted May 1999 and revised March 2002.

Concentrations of Dioxenethion were detected in the groundwater samples collected from monitoring wells MW-4, MW-6, MW-7, MW-8, MW-9, and MW-11. A TRG for Dioxenethion has not been published.

Twenty-six VOCs were detected in the February 2003 groundwater sample collected from MW-8. Ten of the 26 VOCs detected in the February 2003 groundwater sample collected from MW-8 were above the applicable TRGs.

Thirteen VOCs were detected in the February 2003 groundwater sample collected from MW-9. Five of the thirteen VOCs detected in the groundwater sample collected from MW-9 were above the applicable TRG.

Four VOCs were detected in the February 2003 groundwater sample collected from MW-11. Two of the four VOCs detected in the groundwater sample collected from MW-11 were above the applicable TRG.

4.4 Surface Water Monitoring

During the February 2003 sampling event, five surface water samples were collected from Green's Creek and those samples were analyzed for VOCs and Dioxathion. Analytical results for these samples are summarized in Table 5 and Table 6 for parameters detected above the PQL.

The VOC Benzene was detected in the surface water samples collected from the five sampling locations at concentrations ranging from 1.17 ppb in the sample collected from CM-2 to 4.04 ppb in the sample collected from CM-5.

The VOC Carbon Tetrachloride was detected in the surface water samples collected from CM-1 and CM-2. The concentration of Carbon Tetrachloride in the sample collected from CM-2 was slightly lower than the concentration of Carbon Tetrachloride detected in the sample collected from CM-1. Carbon Tetrachloride was not detected in the surface water samples collected from CM-3, CM-4, and CM-5.

The VOC Chloroethane was detected the surface water samples collected from CM-1, CM-2, CM-3, and CM-4. The concentrations of Chloroethane detected in the four samples were highest at CM-1, the upstream sample. The concentration of Chloroethane decreased with each successive sample moving downstream. Chloroethane was not detected in the surface water sample collected from CM-5. This suggests that the Chloroethane originates at a point upstream of CM-1, and concentrations are below detection where the stream exits the site.

The VOC Chloroform was detected in the surface water sample collected from CM-1. Chloroform was not detected in the surface water samples collected from CM-2, CM-3, CM-4, and CM-5.

The VOC Napthalene was detected in the surface water sample collected from CM-1, CM-2, CM-3, CM-4, and CM-5. Concentrations are not believed to be accurate due to the presence of Napthalene in the laboratory method blank.

Six VOCs, Benzene, 1,3-Dichlorobenzene, Napthalene, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene, were detected in the stream sediment sample collected from CM-4.

Eight VOCs, Bromomethane, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Napthalene, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, 1,2,4-Trimethylbenzene, and 1,3,5-Trimethylbenzene, were detected in the stream sediment sample collected from CM-5.

Trans-Dioxathion was detected in the stream sediment samples collected from CM-1, CM-3, and CM-5. Trans-Dioxathion was not detected in the stream sediment samples collected from CM-2, and CM-4. Neither cis-Dioxathion nor Dioxenethion were detected in any of the five stream sediment samples.

Total organic carbon (TOC) was measured in the sediment at concentrations ranging from approximately 2 to 7 ppm.

Grain size analyses were performed for sediment samples collected from CM-3, CM-4, and CM-5 sampling locations. CM-1 and CM-2 sediments were similar to those at CM-3. CM-3 showed primarily silt and clay with 97.4% of the sample passing through the #200 sieve. CM-4 showed primarily sand and gravel with 95.9% of the sample retained by the #200 sieve. CM-5 showed primarily sand and gravel with 93.7% of the sample retained by the #200 sieve.

4.6 QA/QC Samples

The results of the QA/QC samples are summarized in Tables 2 and 3 with the corresponding analytical results. In general, Eco-Systems concluded that the laboratory analyses were conducted under well-controlled conditions, and with sufficient precision and accuracy to provide accurate analytical results.

Eco-Systems reviewed the case narrative for the surface water and sediment analytical results prepared by Bonner Analytical Testing Company. The case narrative notes that all QA.QC data were found to pass guidelines according the EPA Method 8000, with the exception of the sediment sample and its duplicate for the CM-3 sediment sample.

- Cis-Dioxathion was detected in the surface water sample collected from location CM-2 in Green's Creek.
- Dioxenethion was detected in the surface water samples collected from locations CM-3, CM-4, and CM-5.
- Trans-Dioxathion was detected in the stream sediment samples collected from locations CM-1, CM-3, and CM-5.

5.2.2 Volatile Organic Compounds

- During the December 2002 sampling event, concentrations of VOCs above applicable TRGs were detected in the groundwater samples collected from monitoring wells MW-4, MW-8, MW-9, and MW-11. The greatest number of detected VOCs and the highest concentrations of VOCs were detected in the groundwater sample collected from monitoring well MW-8, which is located in the former dioxathion production area.
- During confirmation sampling conducted in February 2003, VOCs were not detected in the groundwater sample collected from MW-4.
- During confirmation sampling conducted in February 2003, concentrations of VOCs above applicable TRGs were detected in the groundwater samples collected from MW-8, MW9, and MW-11. As with the December 2002 samples, the greatest number of VOCs and the highest concentrations of VOCs were detected in the groundwater sample collected from MW-8. However, both the numbers of VOCs detected and the concentrations of many of the detected VOCs, were notably less than from the December 2002 sampling event.
- Concentrations of seven VOCs, Benzene, Carbon Tetrachloride, Chloroethane, Chloroform, Napthalene, 1,2,3-Trichlorobenzene, and 1,2,4-Trichlorobenzene, were detected in one or more of the surface water samples collected from the five surface water sampling locations. The greatest number of VOCs and, in general, the highest concentrations of VOCs were detected in the surface water sample collected from location CM-1, which is the westernmost stream sampling location. An upstream source for the VOCs detected in the surface water samples may be indicated.
- Concentrations of twelve VOCs were detected in one or more of the stream sediment samples collected from the five stream sediment sampling locations. The greatest number of VOCs and, in general, the highest concentrations of VOCs were detected in the stream sediment sample collected from location CM-1, which is the westernmost stream sampling location. An upstream source for the VOCs detected in the stream sediment samples may be indicated.

5.2.3 Semi-Volatile Organic Compounds

- During the December 2002 sampling event, one SVOC, 4-Methylphenol was detected in the groundwater sample collected from MW-8 at a concentration less than the applicable TRG.

TABLES

TABLE 1
GROUNDWATER ELEVATION DATA SUMMARY - MARCH 5, 2003
HERCULES, INC.
HATTIESBURG, MISSISSIPPI

WELL NO.	TOC ELEVATION (ft.)[1]	WATER DEPTH (ft)[2]	GROUNDWATER ELEVATION (ft.)
PERMANENT MONITOR WELLS			
MW-1	174.12	4.25	169.87
MW-2	160.07	4.70	155.37
MW-3	160.03	5.23	154.80
MW-4	159.75	9.32	150.43
MW-5	160.99	7.48	153.51
MW-6	174.05	6.80	167.25
PIEZOMETERS			
TP-1	172.18	3.86	168.32
TP-2	171.72	10.26	161.46
TP-3	169.74	7.26	162.48
TP-4	163.64	3.14	160.50
TP-5	160.54	6.52	154.02
TP-6	158.63	5.42	153.21
TP-7	167.17	8.01	159.16
TP-8	183.79	13.07	170.72
TP-9	163.44	5.23	158.21
TP-10	179.69	13.36	166.33
TP-11	162.26	7.15	155.11
TP-12	159.95	9.31	150.64
TP-13	156.99	6.22	150.77
TP-14	164.35	5.65	158.70
STAFF GAUGES			
SG-1	150.11	0.54	150.65
SG-2	145.13	0.42	145.55
SG-3	144.03	0.40	144.43
SG-4	137.80	0.53	138.33

[1] TOC = "top of casing" measured relative to mean sea level (ft. MSL).

[2] Water depth is a relative depth measured from the TOC.

[3] Date water level survey was completed is presented in parentheses for each site.

TABLE 3
SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS - DECEMBER 4 AND 5, 2002
HERCULES INC.
HATTIESBURG, MISSISSIPPI

Analytes	Concentrations in parts per billion (*ppb*)											
	MW-1	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**	**TRG[1]**
Dioxathion												
cis-Dioxathion	nd	nd	nd	3.34	nd	nd	nd	nd	12.8	nd	5	
trans-Dioxathion	nd	nd	nd	nd	nd	nd	nd	53.9	nd	nd	nd	
total	nd	nd	nd	3.34	nd	nd	nd	53.9	12.8	nd	5	54.8
Dioxenethion	nd[2]	nd	nd	12.9	nd	1.12	9.57	94.3	5.9	nd	50.3	na
Volatiles												
1,1-Dichloroethene	na[3]	na	na	nd	na	na	nd	**17**	5.92	nd	nd	7
Benzene	na	na	na	**14**	na	na	nd	**6900**	**9.15**	nd	**114**	5
Trichloroethene	na	na	na	nd	na	na	nd	**5.8**	nd	nd	nd	5
Toluene	na	na	na	nd	na	na	nd	28	nd	nd	nd	1000
Chlorobenzene	na	na	na	1.81	na	na	nd	**290**	nd	nd	nd	100
Bromodichloromethane	na	na	na	nd	na	na	nd	**6.84**	nd	nd	nd	0.168
Bromomethane	na	na	na	nd	na	na	nd	4.07	nd	nd	nd	8.52
Carbon Tetrachloride	na	na	na	**10**	na	na	nd	**16000**	nd	nd	nd	5
Chloroethane	na	na	na	**63**	na	na	nd	**66**	nd	nd	nd	3.64
Chloroform	na	na	na	nd	na	na	nd	**1800**	nd	nd	nd	0.155
Chloromethane	na	na	na	**1.72**	na	na	nd	**39.2**	nd	nd	nd	1.43
Dibromochloromethane	na	na	na	nd	na	na	nd	**4.45**	nd	nd	nd	0.126
1,2-Dichlorobenzene	na	na	na	nd	na	na	nd	2.71	nd	nd	nd	600
1,3-Dichlorobenzene	na	na	na	nd	na	na	nd	3.75	nd	nd	nd	5.48
1,4-Dichlorobenzene	na	na	na	nd	na	na	nd	3.8	nd	nd	nd	75
1,2-Dichloroethane	na	na	na	nd	na	na	nd	**20**	nd	nd	3.11	5
cis-1,2-Dichloroethene	na	na	na	nd	na	na	nd	19	nd	nd	nd	70
Ethyl Benzene	na	na	na	nd	na	na	nd	55.6	nd	nd	nd	700
Isopropylbenzene	na	na	na	1.26	na	na	nd	4.6	2.48	nd	nd	679
p-Isopropyltoluene	na	na	na	nd	na	na	nd	23.9	nd	nd	nd	na
Methylene Chloride	na	na	na	nd	na	na	nd	**26.1**	nd	nd	nd	5
Naphthalene	na	na	na	5.38	na	na	nd	**9.14**	nd	nd	nd	6.2
Tetrachloroethene	na	na	na	nd	na	na	nd	**8.51**	nd	nd	nd	5

TABLE 4
SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS - FEBRUARY 11, 2003
HERCULES, INC.
HATTIESBURG, MISSISSIPPI

Analytes	PQL[1] (*ppb*)	Concentrations in parts per billion (*ppb*)											
		MW-1	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**	**TRG[2]**
Volatiles													
1,1-dichloroethene	10.00	na[3]	na	na	nd[4]	na	na	na	1.85 J[5]	nd	na	nd	7
benzene	10.00	na	na	na	nd	na	na	na	**12000**	**64.3**	na	6.39 J	5
trichloroethene	10.00	na	na	na	nd	na	na	na	3.2 J	nd	na	nd	5
toluene	10.00	na	na	na	nd	na	na	na	35.4	nd	na	nd	1000
chlorobenzene	10.00	na	na	na	nd	na	na	na	230 J	5.85 J	na	nd	100
bromodichloromethane	10.00	na	na	na	nd	na	na	na	4.72 J	nd	na	nd	0.168
carbon tetrachloride	10.00	na	na	na	nd	na	na	na	**12000**	**20.7**	na	nd	5
chloroethane	12.00	na	na	na	nd	na	na	na	**85.5**	**19.7**	na	nd	3.64
chloroform	10.00	na	na	na	nd	na	na	na	**1300**	9.83 J	na	nd	0.155
chloromethane	10.00	na	na	na	nd	na	na	na	3.34 J	nd	na	nd	1.43
1,2-dichlorobenzene	10.00	na	na	na	nd	na	na	na	2.22 J	nd	na	nd	600
1,4-dichlorobenzene	10.00	na	na	na	nd	na	na	na	3.14 J	nd	na	nd	75
1,1-dichloroethane	10.00	na	na	na	nd	na	na	na	nd	2.23 J	na	nd	798
1,2-dichloroethane	10.00	na	na	na	nd	na	na	na	**79.8**	1.43 J	na	nd	5
cis-1,2-dichloroethene	10.00	na	na	na	nd	na	na	na	17.5	nd	na	nd	70
ethyl benzene	10.00	na	na	na	nd	na	na	na	67.5	1.53 J	na	nd	700
isopropylbenzene	10.00	na	na	na	nd	na	na	na	4.35 J	1.92 J	na	nd	679
p- isopropyltoluene	10.00	na	na	na	nd	na	na	na	23.8	1.8 J	na	nd	na[5]
napthalene	11.00	na	na	na	34.4 B[6]	na	na	na	25.0 B	31.7 B	na	42.6 B	6.2
styrene	10.00	na	na	na	nd	na	na	na	1.25 J	nd	na	nd	100
tetrachloroethene	10.00	na	na	na	nd	na	na	na	**48.9**	nd	na	nd	5
1,2,3-trichlorobenzene	10.00	na	na	na	45.9 B	na	na	na	25.3 B	36.8 B	na	53.4 B	na
1,2,4-trichlorobenzene	10.00	na	na	na	9.79 B	na	na	na	5.73 B	4.98 B	na	13.55 B	70
1,1,1-trichloroethane	10.00	na	na	na	nd	na	na	na	1.50 J	nd	na	nd	200
1,2,4-trimethylbenzene	10.00	na	na	na	nd	na	na	na	1.92 J	nd	na	nd	12.3
1,3,5-trimethylbenzene	10.00	na	na	na	nd	na	na	na	1.8 J	nd	na	nd	12.3
xylenes (total)	15.00	na	na	na	nd	na	na	na	62.4	nd	na	nd	10000

TABLE 5

STREAM SEDIMENT AND SURFACE WATER ANALYTICAL RESULTS FOR DIOXATHION - FEBRUARY 11, 2003

HERCULES, INC.

HATTIESBURG, MISSISSIPPI

TAGET PARAMETER	PQL (*ppb*)[1]	Concentration in parts per billion (*ppb*)[2] CM-1	CM-2	CM-3	CM-4	CM-5
SURFACE WATER						
Dioxenethion	2.19	nd[3]	nd	3.16	BPQL[4]	3.07
Dioxathion (cis)	4.75	nd	8.72	nd	nd	nd
Dioxathion (trans)	3.04	nd	nd	nd	nd	nd
STREAMBED SEDIMENT						
Dioxenethion	170	nd	nd	nd	nd	nd
Dioxathion (cis)	134	nd	nd	nd	nd	nd
Dioxathion (trans)	149	790	nd	1370	nd	448

Notes:

[1] Represents the reporting limit or practical quantitation limit (PQL) of the analytical method in parts per billion (ppb).

[2] Results are presented in ppb with reference to the stream location (CM) from which the sample was collected.

[3] nd = "Not Detected" at or above the method detection limit.

[4] BPQL = "Below the Practical Quantitation Limit" of the analytical method in ppb.

FIGURES

ESI

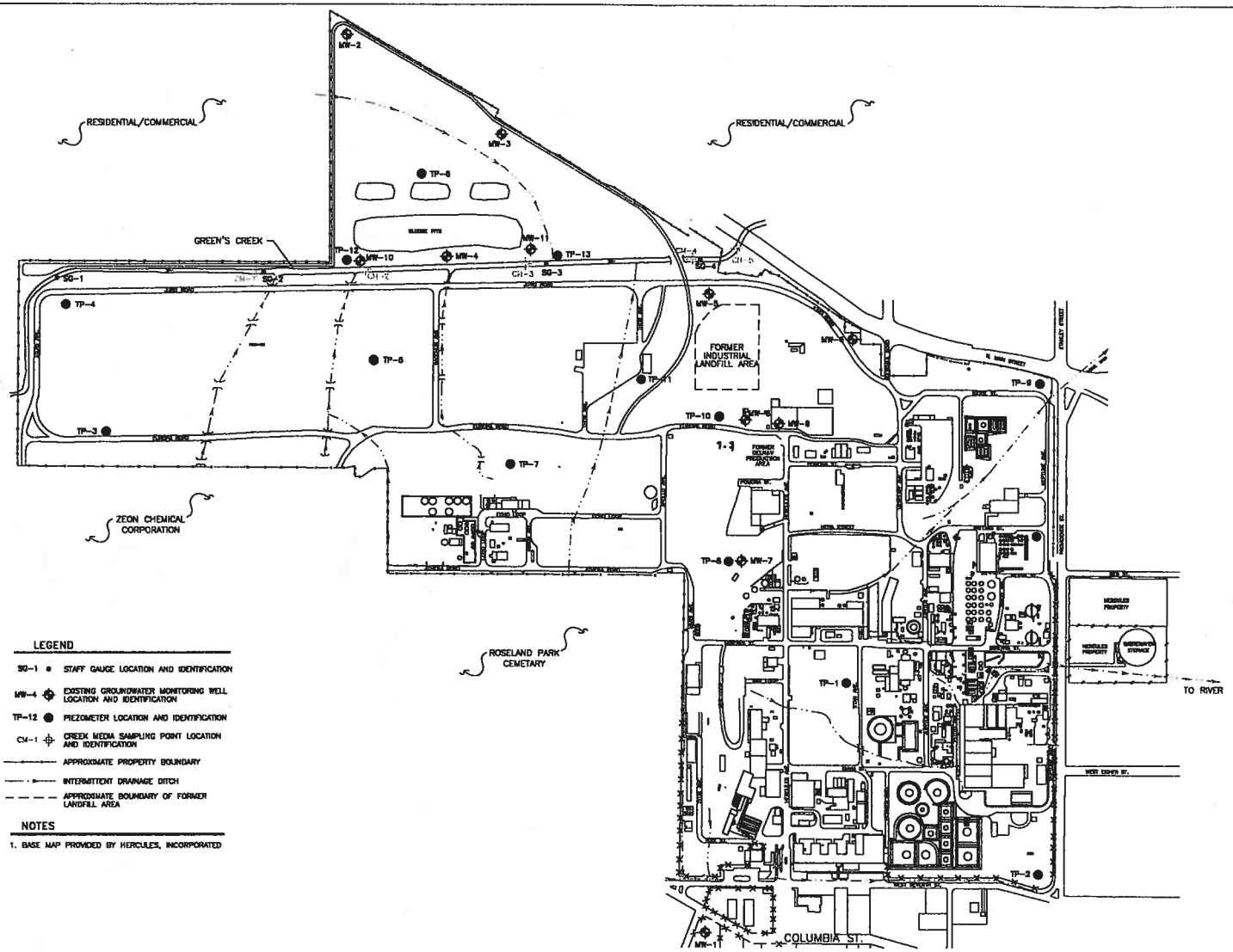
FIGURE 1

SITE LOCATION MAP

ESI

FIGURE 2

SITE PLAN SHOWING DATA POINT LOCATIONS



LEGEND

- SG-1 • STAFF GAUGE LOCATION AND IDENTIFICATION
- MW-4 ⊕ EXISTING GROUNDWATER MONITORING WELL LOCATION AND IDENTIFICATION
- TP-12 ● PIEZOMETER LOCATION AND IDENTIFICATION
- CM-1 ⊕ CREEK MEDIA SAMPLING POINT LOCATION AND IDENTIFICATION
- APPROXIMATE PROPERTY BOUNDARY
- INTERMITTENT DRAINAGE DITCH
- APPROXIMATE BOUNDARY OF FORMER LANDFILL AREA

NOTES

1. BASE MAP PROVIDED BY HERCULES, INCORPORATED

DATE:	3/18/03
SCALE:	1"=450'
DRAWN:	N. SISSON
CHECKED:	
REVIEWED:	4-4-03
PROJECT MANAGER:	CWD

HERCULES
CHEMICAL SPECIALTIES

Eco·Systems, Inc.
Consultants, Engineers and Scientists

SITE PLAN SHOWING DATA POINT LOCATIONS

HERCULES CHEMICAL CO.
HATTIESBERG, MISSISSIPPI

PROJECT NO.	HER22173
CAD FILE	HER22173-DATA.dwg
FIGURE	2

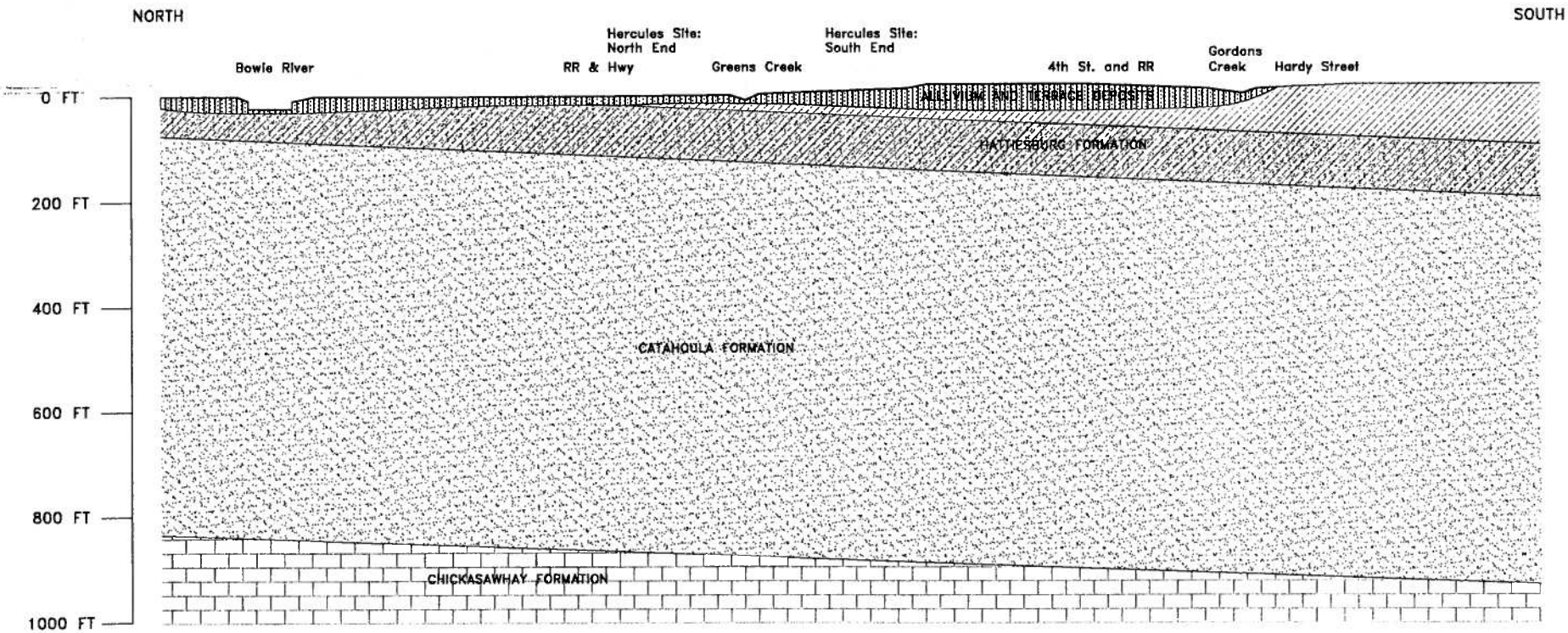
J.N.S. 03/17/03 S:\PROJECTS\HER22173\DWGS\HER22173-DATA.dwg

ESI

FIGURE 3

CONCEPTUAL REGIONAL GEOLOGIC CROSS SECTION

VERTICAL SCALE: 1"=200'
HORIZONTAL SCALE: 1"= 1200'



LEGEND

- SILTY SAND
- SAND, GRAVELY SAND, AND SILTY SAND
- CLAY AND SILTY CLAY
- LIMESTONE

HERCULES
CHEMICAL SPECIALTIES

DATE: 4/1/03
SCALE: AS SHOWN
DRAWN: GALLOWAY
CHECKED:
REVIEWED: 4-4-03
PROJECT MANAGER: CWD

Eco-Systems, Inc.
Consultants, Engineers and Scientists

HERCULES CHEMICAL CO.
HATTIESBERG, MISSISSIPPI

CONCEPTUAL REGIONAL GEOLOGIC CROSS SECTION

PROJECT NO. HER22173
CAD FILE HER22173-XSECTION.dwg
FIGURE 3

J.N.S. 03/17/~ S:\PROJECTS\HER22173\DWGS\HER22173-XSECTION.dwg

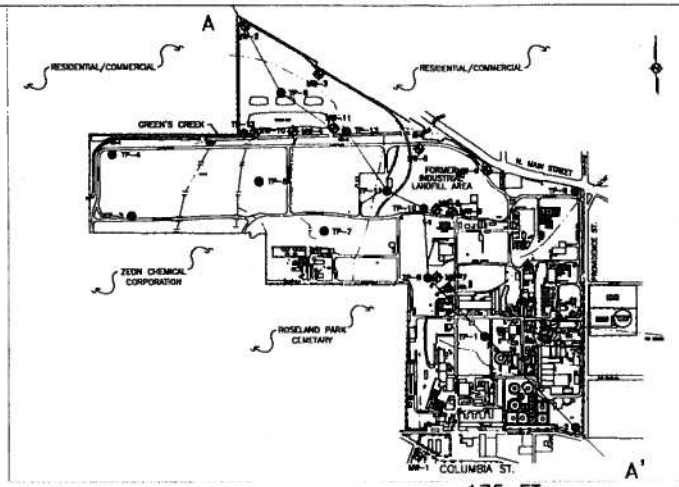
ESI

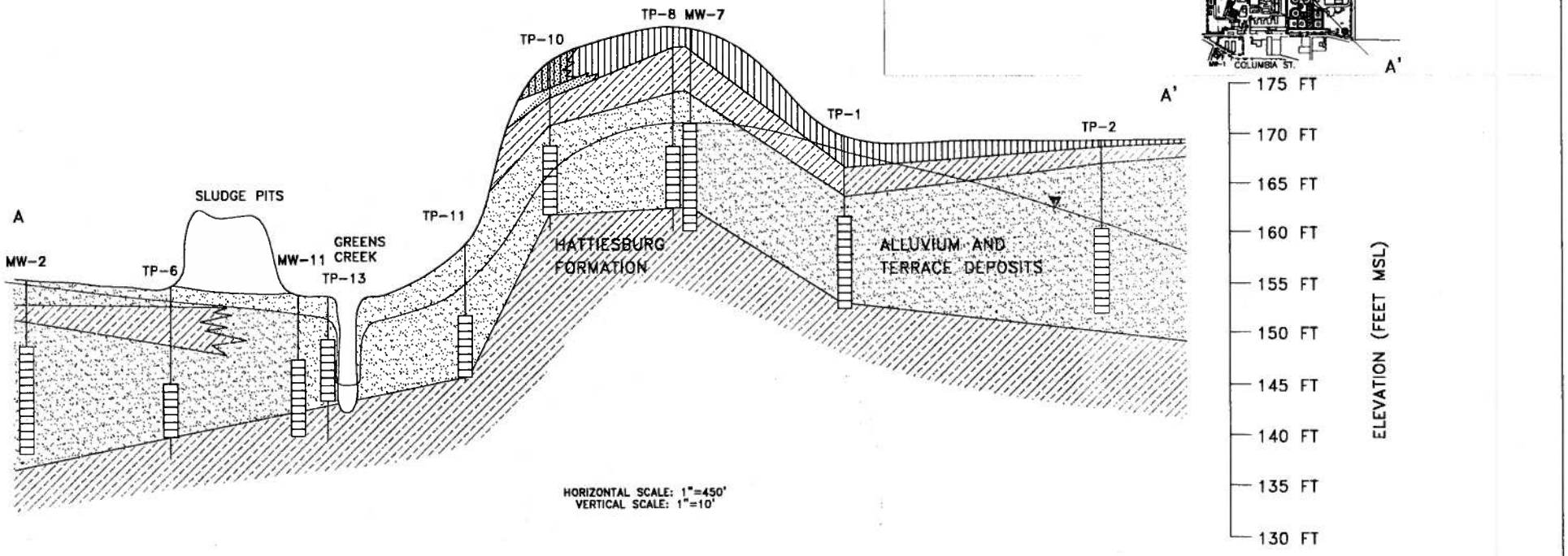
FIGURE 4

SITE CROSS SECTION A-A'

LEGEND

- SAND, GRAVELY SAND, AND SILTY SAND
- SILT
- CLAY AND SILTY CLAY
- SILTY SAND
- WELL PIEZOMETER AND SCREENED INTERVAL
- POTENTIOMETRIC SURFACE MARCH 5, 2003





HORIZONTAL SCALE: 1"=450'
VERTICAL SCALE: 1"=10'

J.N.S. 03/17/03 S:\PROJECTS\HER22173\DWGS\HER22173-DATA.dwg

HERCULES
CHEMICAL SPECIALTIES

DATE:	4/1/03
SCALE:	AS SHOWN
DRAWN:	GALLOWAY
CHECKED:	
REVIEWED:	4-4-03
PROJECT MANAGER:	CAM

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Consultants, Engineers and Scientists

HERCULES CHEMICAL CO.
HATTIESBERG, MISSISSIPPI

SITE CROSS SECTION
A-A'

PROJECT NO.
HER22173

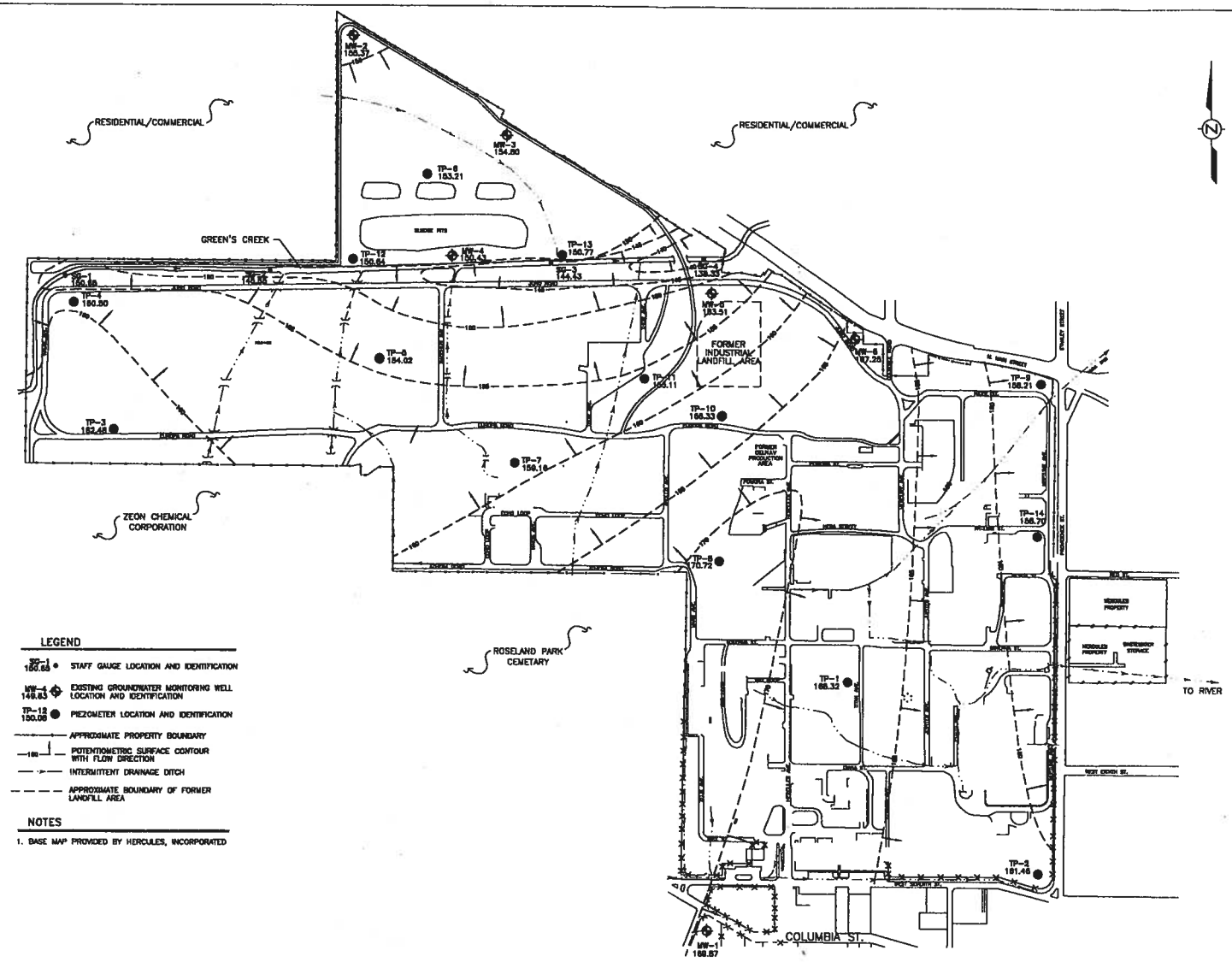
CAD FILE
HER22173-XSECTION2.dwg

FIGURE
4

ESI

FIGURE 5

POTENTIOMETRIC SURFACE MAP
MARCH 5, 2003



J.N.S. 03/17/03 S:\PROJECTS\HER22173\DWGS\HER22173-PSMap.dwg

HERCULES
CHEMICAL SPECIALTIES

DATE:	3/18/03
SCALE:	1"=450'
DRAWN:	N. SISSON
CHECKED:	
REVIEWED:	4-4-03
PROJECT MANAGER:	CRD

Eco·Systems, Inc.
Consultants, Engineers and Scientists

POTENTIOMETRIC SURFACE MAP
MARCH 5, 2003

HERCULES CHEMICAL CO.
HATTIESBERG, MISSISSIPPI

PROJECT NO.	HER22173
CAD FILE	HER22173-PSMap.dwg
FIGURE	5

APPENDICES

APPENDIX A

ANALYTICAL PROTOCOLS

In order to minimize interferences in the determination of dioxathion, sample extracts that appear to contain interferences will be cleaned up using the latest revision of U.S. EPA SW-846 Method 3620, Florisil Cleanup. The volume of eluting solvent necessary for quantitative recovery of dioxathion from the Florisil column will be determined in each laboratory using the dioxathion and dioxenethiol reference standards supplied for calibration of the GC methods.

4.) SULFUR CLEANUP

If there is significant interference from sulfur compounds, the extracts may be cleaned up according to U.S. EPA SW-846 Method 3660, copper option.

5.) ANALYSIS OF EXTRACTS

Previous work performed by Bonner Analytical and Testing (BATCO) has revealed that trans dioxathion undergoes thermal degradation in the Gas Chromatograph column therefore the protocol is changed to a lower temperature analytical method. For All sample extracts will be analyzed by High Performance Liquid Chromatography (HPLC)) using a Photo Diode Array (PDA), operated in . U.S. EPA SW-846 Method 8321 A will be used as general guidance for HPLC methodology. . A five-point calibration curve will be used to calculate the results of analyses. The lowest point on the calibration curve should be equal to, or slightly higher than, the limit of detection of the GC-PDA system. The highest point on the calibration curve should be the end of the linear portion of the PDA response profile. All laboratories will follow the QA/QC criteria described in the analytical method. Those results will be stored at each laboratory for review at a later date, if necessary.

Instrumentation

HPLC – Hewlett Packard Model 10980 Series II Liquid Chromatograph with Diode Array Detector
Fluoresence Detector Hewlett Packard Series 1100 HPLC Column:
Supelco Discovery C18, 250 mm X 4.6 mm ID, 5 µm Particle Size.

Method Parameters

Mobile Phase : Isocratic, 30% Deionized water and 70 % Acetone
Flow: 1.2 mls/min
Injection Volume: 25 µLs
Run Time: 20 Minutes
Oven Temperature 35 °C
Detector Wavelengths
Diode Array: Excitation at 200, 210 and 270 nms
Fluorescence: Excitation at 250 nms, Emission at 410 nms

Surrogate/Internal Standards: A surrogate will be chosen that does not coelute with any dioxathion isomer. Internal standards may or may not be used.

c.) Water samples spiked with cis or trans dioxathion or dioxenethiol will be prepared by the Mississippi State Department of Environmental Quality (MSDEQ) personnel and distributed to each laboratory for inclusion in this study.

d.) Within three weeks of receipt of samples, all results of analyses and all confirmatory results will be reported to MSDEQ, who will collate them and distribute the results to the participating laboratories.

e.) A meeting will be held to review the results of analyses and to decide the next step in the implementation of the analytical methods to be used in monitoring well water samples from the Hercules Incorporated Hattiesburg plant.

f.) After its approval of this sampling and analysis protocol, MSDEQ will determine the time frame for the completion of all sampling and analysis activities and will set the date and time of the review meeting.

g.) Only results greater than or equal to the Limit of Quantitation will be reported. The numerical sum of the cis and trans isomers of dioxathion will be reported as dioxathion. Dioxenethiol will be reported as separate compound.

ESI

APPENDIX B

BORING LOGS AND MONITORING WELL CONSTRUCTION DIAGRAMS

BORING LOG

SHEET 1 OF ___

PROJECT NAME: Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER:
GEOLOGIST: J Ryan
CLASSIFICATION SCHEME:
DRILLER: G+E Services
DRILL METHOD: HSA
WEATHER: Sunny & WARM (62°)

BORING IDENTIFICATION: MW-7
BORE HOLE DIAMETER: 8"
BORING START TIME: 1045 DATE: 2-22-00
BORING COMPLETED TIME: 1159 DATE: 2-22-00
FINAL BORING DEPTH: 20'

GROUNDWATER

INITIAL DEPTH:
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT

THICKNESS:
VOLUME:

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL PID/blows/6"	LITHOLOGY
	2		
	4		
	6		
	8		
10"	10 / 13.9	3/15, 50/6"	SP
13"	12 / 10.8	14/30, 37/30	SP
19"	14 / 5.9	6/12, 18/16	SM
13"	16 / 20.2	3/3, 10/28	SM
Full	18 / 0.1	8/3, 6/10	2.25', 3.25', 3.75'
	20		
	15		

No Sampling 0-10' (see TP-8 Log)

DAMP, Med-dense, tan-brown, f.-Med grn, Sa w/Si; poorly sorted w/ gravel; No odor
MOIST, wet-Sat, DENSE, tan-lt brn, f-med
SAT, Med-dense, (salmon tint), v.f-med, SiSa (14'-17.5'), trace gravel
Coarsens Med-crs, Gravelly Sa (17.5'-18.9')
18.9' DRY, stiff, tan w/ gray mottling, clay w/Si

TD = 20'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER
GEOLOGIST J. Ryan
CLASSIFICATION SCHEME
DRILLER CLE Services
DRILL METHOD HSA
WEATHER Warm, Sunny, Windy

BORING IDENTIFICATION MW-8
BORE HOLE DIAMETER 6"
BORING START TIME 16:10 DATE 2/22/00
BORING COMPLETED TIME 1635 DATE 2-22-00
FINAL BORING DEPTH 16.3'

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
	5		
	10		
	15		

GROUNDWATER
INITIAL DEPTH
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS
VOLUME

No Sampling
(See TP-10 Log)
- Installed ~7' west of TP-10

- Set MW-8 ~6-16'

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BORING LOG

SHEET 1 OF ___

PROJECT NAME	Hercules	BORING IDENTIFICATION	MW-9
PROJECT LOCATION	Hattiesburg, MS	BORE HOLE DIAMETER	8"
PROJECT NUMBER			
GEOLOGIST	J. Ryan	BORING START TIME	1445 DATE 2/22/00
CLASSIFICATION SCHEME			
DRILLER	G+E Services	BORING COMPLETED TIME	1518 DATE 2-22-00
DRILL METHOD	HSA		
WEATHER	Sunny, Warm (70°), Windy	FINAL BORING DEPTH	17.5'

GROUNDWATER — INITIAL DEPTH ___ DEPTH AFTER ___ MINUTES ___

FREE PRODUCT — THICKNESS ___ VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	DESCRIPTION
	0–5			No Sampling (0-5')
2' (full)	6 (6.4)	3/6 7/14		Sandy-Clay, med-stiff to stiff, mottled coloring (brown, red, grey), sand content increases w/ depth, no odor, dry
14"	10–12 (2.9)	2/2 4/8		mst / wet, firm / Loose, gray-tan w/ orange laminae; SaSi (10-11.6') w/ vf. Sa / VfSa Si
20"	15–17 (2.5)	7/13 13/7	SP / CH	SAT / 16.6' DRY, Med-dense / stiff, white-tan / brn-tan, Grav, Sand (f-crs) / 16.6' CL w/ Si, trace Si stringers

Set MW-9 (10' Screen)

TD = 17.5'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER
GEOLOGIST J Ryan
CLASSIFICATION SCHEME
DRILLER G+E Services
DRILL METHOD HSA
WEATHER

BORING IDENTIFICATION MW-10
BORE HOLE DIAMETER 8"
BORING START TIME 9:55 DATE 2/23/00
BORING COMPLETED TIME 10:07 DATE 2/23/00
FINAL BORING DEPTH 14'

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
	5		
	10		
	15		

GROUNDWATER
INITIAL DEPTH
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS
VOLUME

No Sampling (refer to TP-12)

Eco-Systems, Inc.
Environmental Engineers and Scientists

SHEET 1 OF ___

BORING LOG

PROJECT NAME Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER
GEOLOGIST J Ryan
CLASSIFICATION SCHEME
DRILLER G&E Services
DRILL METHOD HSA
WEATHER Cloudy and Mild

BORING IDENTIFICATION MW-11
BORE HOLE DIAMETER 8"
BORING START TIME AM 8:05 DATE 2/23/00
BORING COMPLETED TIME 8:15 DATE 2/23/00
FINAL BORING DEPTH 14'

GROUNDWATER
INITIAL DEPTH [redacted]
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
	5		
	10		
	15		

No Sampling (refer to TP-13)

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF 1

PROJECT NAME Task 2 - RI Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER HER-99
GEOLOGIST Ryan
CLASSIFICATION SCHEME USCS
DRILLER G+E Services
DRILL METHOD HSA w/ 3" spoon
WEATHER Sunny + Hot (88°)

BORING IDENTIFICATION TP-1
BORE HOLE DIAMETER 6"
BORING START TIME 1355 DATE 4-28-99
BORING COMPLETED TIME 1618 DATE 4-28-99
FINAL BORING DEPTH 17'

GROUNDWATER
INITIAL DEPTH
DEPTH AFTER ____ MINUTES ____

FREE PRODUCT
THICKNESS
VOLUME

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
NS	2	Fill 1	NS
	4		
21"	6.0	1/2 3/4	
	6	WH/3	
18"	8	7/13	
		WH/4	
15"	10	5/7	
		3/13	
23"	12	23/32	
NS	14	NS	NS
18"	16	6/6 8/12	
	18		
	20		
	15		

DAMP, firm, med-gray, Fill (0-3') Auger to 4' for obstruction (cuttings) Cl/vf. Sand

DAMP, med-stiff gray w/ blue-green mottling, SaSiCL (vf-f). SAT, loose, tan, 7' SiLa (vf)

med dense

dense (No Sampling 12-15)

V.Si

trace Gravel (f-med)

SAT, Loose-med, DRY, V. Stiff, greenish gray, Cl Si 17.2'

- Set TP-2 TD = 17.0
- Cave to 12' b/s.
- 20/40 to 5.5'
- Seal to 3.0' (Hydrate).

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BORING LOG

SHEET 1 OF _

PROJECT NAME: TASK 2 - RI HERCULES
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: HER-99
GEOLOGIST: RYAN
CLASSIFICATION SCHEME: USCS
DRILLER: G&E Services, Inc.
DRILL METHOD: HSA w/ S. Spoons
WEATHER: Sunny & Hot (90s)

BORING IDENTIFICATION: TP-2
BORE HOLE DIAMETER: 2" → 6"
BORING START TIME: 1135 DATE: 4-28-99
BORING COMPLETED TIME: 1212 DATE: 4-28-99
FINAL BORING DEPTH: 17.0'

GROUNDWATER
INITIAL DEPTH: ~8'
DEPTH AFTER _____ MINUTES _____

FREE PRODUCT
THICKNESS _____
VOLUME _____

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
20"	0.0	2/3 3/3	
22"	2	6/9	
	4.0	13/15 21/10	SM
21"	4	9/12	SM
	0.0 6		
23"	0.0 8	13/15 17/18	SM
22"	0.0 10	18/14 14/15	SM
21"	12	12/14 16/18	SM
NS	14	NS	NS
20"	16	3/12 10/10	SP
	18		
	20		
	15		

DAMP-DRY, LOOSE, BROWN, organics w/ SAND
V.f. SaCL (6"-
MED-DENSE, LT BRN, V. SiSa (vf-f.
w/ gray mottling, v.f. SiSa tr.
MOIST
tan laminae @6.5' SiSa (vf)
WET
SAT
f-med
trace gravel
w/ gravel
NO Sampling 12-15'
Drill out w/ HSA (heaving)
15' SAT, LOOSE, TAN-WHITE, Gravelly Sa w/ Si
17'

- Set TP-2 from 6.5-16.5' TD=17.0'
- Backfill w/ native sand to ~13'
- 20/40 Sand to ~4.5'
- Pellets to ~0.5'.

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME Task 2 - RI Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER HER-99
GEOLOGIST Ryan
CLASSIFICATION SCHEME USCS
DRILLER G+E Services
DRILL METHOD HSA w/ S-spoons
WEATHER Sunny Hot (88°)

BORING IDENTIFICATION TP-3
BORE HOLE DIAMETER 6"
BORING START TIME 1500 DATE 4-28-99
BORING COMPLETED TIME 1527 DATE 4-28-99
FINAL BORING DEPTH 16'

GROUNDWATER
INITIAL DEPTH ___
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
NS	2		NS
Full	4 / 0.0	2/4 4/12	
	6		
	8		
22"	10	12/15 19/5	SM
	12		
	14		
18"	16	3/4 5/5	
	18		
	20		
	25		

NO Sampling 0-4'

DAMP, Med, H-gray+brn V.CLSa 4-5.1'
Loose, fan, SiSa (5.1')

NO Sampling (6-9')

SAT, Med-dense, tan w/white, Sa w/Si (F-med) fr. gravel

NO Sampling

SAT, as above (14-14.8'), SiSa to gravel
SRV, Med-St - Stiff, buff-tan, SiCl fr. Lignite.

- Set TP-3 to ~~10-15~~ 9.6'-14.6' TD=16.0'

Eco-Systems, Inc.
Environmental Engineers and Scientists

SHEET 1 OF ___

BORING LOG

PROJECT NAME: Task 2 - RI Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: HER-99
GEOLOGIST: Ryan
CLASSIFICATION SCHEME: USCS
DRILLER: G+E Services
DRILL METHOD: HSA w/ s-spoons
WEATHER: Sunny + hot (88°)

BORING IDENTIFICATION: TP-4
BORE HOLE DIAMETER: 6"
BORING START TIME: 1602 DATE: 4-28-99
BORING COMPLETED TIME: 1620 DATE: 4-28-99
FINAL BORING DEPTH: 14'

GROUNDWATER
INITIAL DEPTH ___
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	DESCRIPTION
NS	2		NS	Damp, firm, brown, No Sampling (observe cuttings) (0-5') V-CL Sa (vf sa)
				v. Damp, Loose, tan, Si Sa ~4'
17"	5–6	6/7 7/6		moist, firm, gray-tan, V. Si Sa; V. Sa CL w/ Si (vf sa).
	8	NS	NS	No Sampling 7-10'
22"	10–12	7/7 7/7 -/4 7/10	CL	DRY, stiff (crumbly), green-gray, Calcareous Clay br. Silt.
				v. stiff, w/ brn mottling
	14			TD = 14.0'
	16			
	17			~~TD = 17.0'~~
	10			
	15			

- Sand zone has pinched in this direction.
- Set 5' screen 5-10' b/s.

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME Tract 2-RI Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER HER-99
GEOLOGIST Ryan
CLASSIFICATION SCHEME USCS
DRILLER G+E Services
DRILL METHOD HSA w/ S-Spoons
WEATHER Sunny + hot

BORING IDENTIFICATION TP-5
BORE HOLE DIAMETER 6"
BORING START TIME 1700 DATE 4/29/99
BORING COMPLETED TIME 1715 DATE 4/29/99
FINAL BORING DEPTH 15

GROUNDWATER
INITIAL DEPTH 9'
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	moisture density odor color description
18"	2	3/3 4/4		damp loose no Black S. SA w/ coarse sand gravel
	5		NS	no samp 2-5
20"	7	2/7 4/6		damp stiff no gray & orange mottling S. CL
	10	7/11	NS	no sampling 7-10 water @ ~9'
18'	12	11/12		saturated loose no tan CSA w/ s;
	13		NS	~~no sampling 12-13~~ ~~15~~ KS
20"	15	2/7 7/8		saturated loose no tan S. SA (9-14') & S. CL (14'-15')

3-15

- TDC 15'
- Set T.P-5 screen @ 9-14'
- Cave in to 13'
- 20/40 to 7'
- Seal to 6'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME Task 2 - RI Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER HER-99
GEOLOGIST Ryan
CLASSIFICATION SCHEME USCS
DRILLER G&E Services
DRILL METHOD HSA w/ S-spoons
WEATHER Sunny & hot (88°)

BORING IDENTIFICATION TP-6
BORE HOLE DIAMETER 6"
BORING START TIME 1655 DATE 4-28-99
BORING COMPLETED TIME 1725 DATE 4-28-99
FINAL BORING DEPTH 17'

GROUNDWATER
INITIAL DEPTH ___
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY
14"	2	1/3 4/6	
18"	4	3/4 4/4	
22"	6	5/7 7/7	
22"	8	10/11 27/22	
20"	16	10/14 14/14	
	12		
	14		
10"	16	2/6 10/17	
	18		
	20		
	15		

DRY, soft, dk brn, Silt & CC
DAMP, stiff-v.st, lt brn w/ mottlings, SiCL tr. gravel
V. damp, med, olive-brn, SaCL tr. gravel
wet - SAT, med-dense dk brn-brn (Sa) and white (Sa) (f-med grained) @ SaCL tr. gravel SiSd tr. gravel w/ gravel

No Sampling 10-15'

V. Damp, med-stiff, gray-green V. SaCC w/ Si

TD = 17'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME: Task 2 - RI Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: HER-95
GEOLOGIST: Ryan/Sartor
CLASSIFICATION SCHEME: USCS
DRILLER: C+E Services
DRILL METHOD: HSA w/ s-spoons
WEATHER: Sunny hot

BORING IDENTIFICATION: TP-7
BORE HOLE DIAMETER: 6"
BORING START TIME: 1605 DATE: 4-29-99
BORING COMPLETED TIME: 1620 DATE: 4-29-99
FINAL BORING DEPTH: 12'

GROUNDWATER
INITIAL DEPTH: 6'
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	Description (moisture / density / odor / color / classification)
0-2 12	0 - 2	2/2 5/3		Damp loose no brown C/S w/ peat deposits
				no sampling 2-5
7 16"	5 - 7	2/6 9/11		Damp loose no gray w/ lt mottle (vf-f) SaS, w/CL
				No sampling 7-10 (fr...) water @ 6' SiSA @ 10'
22"	10 - 12	4/4 4/8		Damp med stiff color in sand gray/brown SiCl @ 11' w/ peat
	10			
	15			

- TD @ 12'
- Convert to TP-7
- Cave in to 9'
- 20/40 to 4.0'
- Seal to 3.0'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF __

PROJECT NAME: Task 2-RI Hercules	BORING IDENTIFICATION: TP-8
PROJECT LOCATION: Hattiesburg, MS	BORE HOLE DIAMETER: 6"
PROJECT NUMBER: HER-99	
GEOLOGIST: Ryan/Sartor	BORING START TIME: 1450 DATE: 4/29/99
CLASSIFICATION SCHEME: USCS	
DRILLER: G+E Services	BORING COMPLETED TIME: 1521 DATE: 4/29/99
DRILL METHOD: HSA w/ S-spoons	
WEATHER: Sunny/Hot	FINAL BORING DEPTH: 18.5'

GROUNDWATER — INITIAL DEPTH: 13' — DEPTH AFTER ___ MINUTES ___

FREE PRODUCT — THICKNESS: ___ — VOLUME: ___

	RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	DESCRIPTION (moisture, density, odor, color, Description)
-2	18"	0–2	11/7 6/4		Damp med stiff no odor orange ~~brown~~ Fill-6" CL/SL-4
		4		NS	No sampling 2-5
	18"	6	2/3 7/11		Damp med stiff no odor gray w/red mottling SiCl
		8		NS	no sampling 7-10
10-12 (1ft)	10"	10–12	44/50		Moist Med-dense ~~loose~~ no odor orange brown (f-m) Si Sa / gravel
		14		NS	no sample 11-15 water @ 13'
15-17	18"	16	13/17 24/17		Saturated Med-dense ~~loose~~ no odor tan/lt brown (f-m) Si Sand / cl/gravel
		18½		NS	no sampling 17-18.5
18.5-20.5			5/5 9/12		Damp, ~~dense~~ Stiff, no odor gray SiCl

- Completed @ 15:21 @ 18.5'
- Convert to TP-8, screen @ 12.5-17.5'
- Cave in to 18'
- 20/40 to 10'
- Seal to 9'

Eco-Systems, Inc.
Environmental Engineers and Scientists

SHEET 1 OF ___

BORING LOG

PROJECT NAME: Task 2-RI Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: AER-99
GEOLOGIST: Ryan/Sartor
CLASSIFICATION SCHEME: USCS
DRILLER: G+E Services
DRILL METHOD: HSA w/ S-spoons
WEATHER: Sunny/Hot

BORING IDENTIFICATION: TP-9
BORE HOLE DIAMETER: 6"
BORING START TIME: 1815 DATE: 4/25/95
BORING COMPLETED TIME: ___ DATE: ___
FINAL BORING DEPTH: ___

GROUNDWATER
INITIAL DEPTH: ~4
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	DESCRIPTION
18"	2	2/2 2/2		damp loose no odor black/gray S.Sa/gran (water @ 4')
				no sampling 2-5
10"	5, 7	1/1 1/1		damp to moist, stiff, no odor, gray w/mottling S.Cl
				No Sample 7-10
20"	10, 12	2/3 4/6		damp stiff no gray/fe S.Cl
	13, 14, 15			no sampling 12-15
20	17, 18, 19	2/3 10/11		damp stiff no gray/green S.Cl
				no sampling 17-20
20	10	4/9 12/14		damp dense no gree Cl w/silt
	15			+ Drill new boring to 10 ft bgs screen @ 4-9' · Set TP-9 · Cave in to 8' · 20/40 to 3' · Seal to 2'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME: Task 2 - RI Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: HBR-95
GEOLOGIST: Sartor
CLASSIFICATION SCHEME: USCS
DRILLER: G+E Services
DRILL METHOD: HSA w/ s-spoons
WEATHER: Sunny/Hot

BORING IDENTIFICATION: TP-10
BORE HOLE DIAMETER: 6"
BORING START TIME: 1058 DATE: 4-29-95
BORING COMPLETED TIME: 1115 DATE: 42995
FINAL BORING DEPTH: 17 ~~16.5'~~

GROUNDWATER
INITIAL DEPTH: ~11'
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS: ___
VOLUME: ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	DESCRIPTION
22"	0.0	3/4 6/5		Dry, Loose, Brown/Black (vf-f) Si Sa (Fill)
12"	[illegible] 2	6/6 5/3		Damp / / (f-med)
12"	4.0	3/3 6/3		Moist, Firm, ~5' mottled w/ gray, silty clay
14"	6.0	3/4 4/4		Moist, Loose, grayish (vf-f) Si Sa
12"	8.0	3/4 4/5		Moist, Loose
10"	10.0	7/9 12/12		wet (saturated), medium dense, tan (f-m) Gr Si Sa ~~[illegible]~~ RS
20"	12	10/10 14/17		saturated
	14			no sample 14-14.5
20"	16	1/1 4/5		~~Saturated~~ damp, stiff, gray w/ mottling ~~(f-m) Si Sa w/ silt~~ Si Cl w/ Gr
	18			

- completed @ 1115 @ 16.5' TD (14.5??)
- Convert to TP-10 (8-14.5')
- 20/40 to 5 1/2'
- Seal to 4 1/2'
- 1' of Cave in to 13.5'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME Task 2 - RI Hercules
PROJECT LOCATION Hattiesburg, MS
PROJECT NUMBER AER-95
GEOLOGIST Ryan
CLASSIFICATION SCHEME USCS
DRILLER G+E Services
DRILL METHOD HSA w/ 5-Spoons
WEATHER sunny/hot

BORING IDENTIFICATION TP-11
BORE HOLE DIAMETER 6"
BORING START TIME 1735 DATE 4/27/99
BORING COMPLETED TIME 1735 DATE 4/29/99
FINAL BORING DEPTH 15'

GROUNDWATER
INITIAL DEPTH 7.5'
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	
20'	2	3/1 2/4		damp loose wooden Black S, Sa/gravel
	3 4 5		NS	no sample 5-7
12"	7 8 9	2/2 4/5		moist loos wooden tan S, Sa/gravel water @ 8.5
	10		NS	no sampling 7-10
22"	12	3/3 5/9		saturated loose wooden gray with S, Sa/gravel
20"	14 15	7/7 13/13		saturated firm wooden gray S, Cl.

- Completed @ 15 ft bgs
- TP-11 screen @ 8-13'
- Cave in to 9'
- 20/40 to 6.5'
- Seal to 5.5'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF __

PROJECT NAME: Task 2 -RI Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: HER-99
GEOLOGIST: Ryan /Sartor
CLASSIFICATION SCHEME: USCS
DRILLER: G+E Services
DRILL METHOD: HSA w/ s-spoons
WEATHER: sunny/hot

BORING IDENTIFICATION: TP-12
BORE HOLE DIAMETER: 6"
BORING START TIME: 925 DATE: 4-29-99
BORING COMPLETED TIME: 0945 DATE: 4-29-99
FINAL BORING DEPTH: 17'

GROUNDWATER
INITIAL DEPTH: ~7'
DEPTH AFTER ____ MINUTES ____

FREE PRODUCT
THICKNESS ____
VOLUME ____

	RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	
0-2	22"	2	3/3 3/3		Damp Loose brown/orange (f) S. Sa w/cl G/Sa
2-4	18"	4	2/3 3/4		No Sampling orange stiff S. Sand to tan
6	18"	6	3/6		tan/gray vf S. Sa
	ns	8		NS	no sampling 6-10'
	22"	10 / 12	5/9 12/13		saturated loose tan (f-m) Si Sand/gravel
		14		NS	no sampling 12-15 clay 13' (Driller said TOP clay). Si Cl
	16"	16	6/7 8/10		Damp med stiff gray w/ orange Si A
		18			TD=17'
		20			

- Convert to TP-12 f10 5'-15'
- Native to 8'
- 20/40 to 4'
- Seal to 3'

Eco-Systems, Inc.
Environmental Engineers and Scientists

BORING LOG

SHEET 1 OF ___

PROJECT NAME: Task 2 - RI Hercules
PROJECT LOCATION: Hattiesburg, MS
PROJECT NUMBER: HER-95
GEOLOGIST: Sartor
CLASSIFICATION SCHEME: USCS
DRILLER: G+E Services
DRILL METHOD: HSA w/ S-spoons
WEATHER: sunny/hot

BORING IDENTIFICATION: TP-13
BORE HOLE DIAMETER: 6"
BORING START TIME: 810 DATE: 4-29-99
BORING COMPLETED TIME: 835 DATE: 4-29-99
FINAL BORING DEPTH: 14'

GROUNDWATER
INITIAL DEPTH: ~5'
DEPTH AFTER ___ MINUTES ___

FREE PRODUCT
THICKNESS ___
VOLUME ___

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	DESCRIPTION
18"	0.6 / 2	5/4 5/6	SC	Dry, Loose, brn-gray, Cl Sa (0-2')
19"	1.0 / 4	4/4 4/4	SC	Damp, Loose, lt gray (tan), Cl Sa w/gravel (2'-5')
8"	16.4 / 6	4/4 3/5	SM	Saturated (5'), Med-dense, (vf-f), Si Sa w/trace gravel (5'-7')
18"	0.4 / 8	6/17 16/18	SP	(f-med) Gravelly Sand w/Si (7-10')
12"	1.1 / 10	3/5 6/12	SP	Loose, (f), V Gravelly Sand w/silt
10"	0.1 / 12	3/2 4/7	CL	Damp, Stiff, brown/gray mottling, Si Cl (10-10.5')
14"	0.0 / 14	2/5 3/8	CL	
	16			
	18			
	20			
	15			

TD = 14'

- Convert to TP-13 from 4-11'.
- Add filter sock + 20/40 from TD.
-

Eco-Systems, Inc.
Environmental Engineers and Scientists

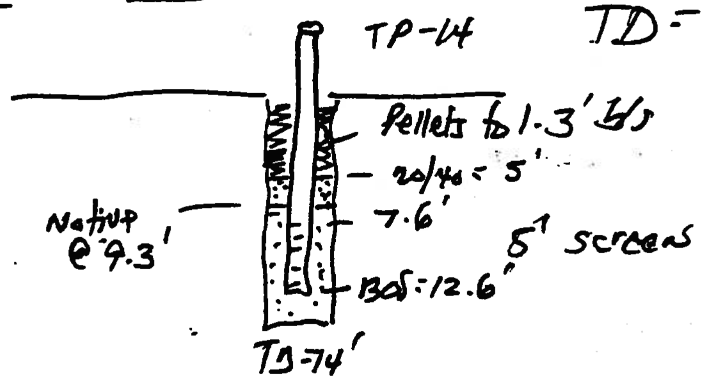
SHEET 1 OF ___

BORING LOG

PROJECT NAME: Task 2 - RI Hercules	BORING IDENTIFICATION: TP-14
PROJECT LOCATION: Hattiesburg, MS	BORE HOLE DIAMETER: 3"
PROJECT NUMBER: HER-95	BORING START TIME: 1630 DATE: 5-10-99
GEOLOGIST: Ryan	
CLASSIFICATION SCHEME: USCS	
DRILLER: G+E Services	BORING COMPLETED TIME: 1650 DATE: 5-10-99
DRILL METHOD: HSA w/ s-spoons	
WEATHER:	FINAL BORING DEPTH:

RECOVERY (INCHES)	DEPTH IN FEET	SYMBOL	LITHOLOGY	GROUNDWATER	FREE PRODUCT
				INITIAL DEPTH ~7'	THICKNESS
				DEPTH AFTER ___ MINUTES ___	VOLUME

DEPTH IN FEET	DESCRIPTION
2	DAMP, moist (@2') / firm, / brown, black-stained / Fill CCSa (2.5'–3.1')
4	Damp (3.5) / Loose, / lt. brn, / SiSa tr. cL (3.1'–5')
6	Moist (5'), / firm, / brown, / SiSa (5'–7')
8	wet-sat, SAT / Loose, / Lt. brn, tan / SiSa f-med (trace gravel) 7'– w/ gravel @ 10.5'
10	
12	
14	TD = 14'
16	



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APPENDIX C

GROUNDWATER SAMPLE COLLECTION LOGS

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-4
Site Location: Hattiesburg, Mississippi

Start Date: 10/14/2002 Finish Date: 10/14/2002
Sample Technician: Charles Coney and Rodney Sartor
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 15
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 4.60
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): 0.8

Water Level Measurements		
Date	Time	Water Level (TOC)
10/14/2002	12:24	10.40

WELL DEVELOPMENT/PURGING DATA

Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/14/2002 12:40	0.5	6.07	644.0	22.7	7.18			
12:50	1.0	6.16	621.0	21.7	5.03			
12:55	1.25	6.12	566.0	21.7	4.67			

Sample Identification:

Weather Conditions During Sampling:

Comments:

Signature: Date:

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/14/2002	13:05		

co-Systems, Inc.
vironmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-6
Site Location: Hattiesburg, Mississippi

Start Date: 10/14/2002 Finish Date: 10/14/2002
Sample Technician: Charles Coney and Rodney Sartor
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 18
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 9.95
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): 1.7

Water Level Measurements		
Date	Time	Water Level (TOC)
10/14/2002	15:52	8.05

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/14/2002 16:00		6.72	110.6	24.9	1.93			
16:03		5.75	118.5	24.6	1.58			
16:05		5.68	104.2	24.5	1.26			
16:08		5.56	147.7	24.4	1.26			
16:09		5.61	120.2	24.2	1.09			
16:11		5.57	181.7	24.0	1.26			
16:13		5.63	80.0	23.9	1.48			
16:15		5.55	170.0	24.0	1.30			
16:17		5.57	186.8	24.2	1.18			
16:19		5.49	184.8	24.1	1.05			

Sample Identification:

Weather Conditions During Sampling:

Comments:

gnature: Date:

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/14/2002	16:22		

co-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-2
Site Location: Hattiesburg, Mississippi

Start Date: 12/4/02
Finish Date: 12/4/02
Sample Technician: Charles Coney
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 20.5
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 14.95
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): 2.5

Water Level Measurements		
Date	Time	Water Level (TOC)
12/4/02	15:18	5.55
	15:21	5.70
	15:25	5.70

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
12/4/02 15:25	0.25	5.77	104.6	19.8	5.6	3.40		
15:30	0.5	5.76	103.4	19.8	5.8	2.72		
15:35	0.75	5.68	103.1	19.7	6.7	2.52		
15:40	1.0	5.60	102.9	19.8	4.1	1.98		

Sample Identification: MW-2

Weather Conditions During Sampling: very cloudy, breezy, lower 60's

Comments: Delivered samples directly to Bonner Analytical

Signature: Spencer Trichell Date: 12/17/02

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
12/4/02	15:45	1 L amber	none

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-4
Site Location: Hattiesburg, Mississippi

Start Date: 12/4/02
Finish Date: 12/5/02
Sample Technician: Charles Coney
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 18.5
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 8.58
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 1.5

Water Level Measurements		
Date	Time	Water Level (TOC)
12/4/02	10:27	9.92
12/5/02	12:45	9.67
12/5/02	12:55	9.71

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
12/5/02 12:55	0.2	6.22	382.0	19.6	7.3	0.87		
13:00	0.3	6.20	367.0	20.0	6.3	0.61		
13:05	0.4	6.18	363.0	20.1	3.4	0.57		
13:10	0.5	6.17	360.0	20.2	2.9	0.51		

Sample Identification: MW-4

Weather Conditions During Sampling: cloudy, breezy, lower 40's

Comments: _Delivered sample directly to Bonner Laboratory

Signature: Spencer Tuchell Date: 12/17/02

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
12/5/02	13:15	1L ambers	none
		40 mL septa vials	HCl

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-6
Site Location: Hattiesburg, Mississippi

Start Date: 12/4/02
Finish Date: 12/5/02
Sample Technician: Charles Coney
Purge/Sample Method: Peristaltic Pump, volume based
Well Diameter: 2"
Total Depth of Well: 23.25
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 15.52
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 2.6

Water Level Measurements		
Date	Time	Water Level (TOC)
12/4/02	11:07	7.73

WELL DEVELOPMENT/PURGING DATA

Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
12/5/02 14:57	2.6	5.47	163	20.4	5.4	1.82		
15:10	5.2	5.46	165	20.6	7.3	1.70		
15:25	7.8	5.50	167	20.5	4.6	1.75		

Sample Identification: MW-6

Weather Conditions During Sampling: cloudy, breezy, lower 40's

Comments: _Sample was relinquished directly to Bonner Analytical

Signature: Spencer Trichell Date: 12/17/02

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
12/5/02	15:30	1L ambers	none

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-8
Site Location: Hattiesburg, Mississippi

Start Date: 12/4/02
Finish Date: 12/5/02
Sample Technician: Charles Coney
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 20
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 5.91
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 1.0

Water Level Measurements		
Date	Time	Water Level (TOC)
12/4/02	9:35	14.09

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
12/5/02 10:57	0.3	5.93	545	21.4	1.0	0.63		
11:02	0.40	5.93	543	21.6	1.10	0.6		
11:07	0.50	5.92	543	21.7	0.95	0.55		
11:12	0.60	5.92	545	21.8	1.00	0.52		

Sample Identification: MW-8, MS, and MSD

Weather Conditions During Sampling: cloudy, breezy, lower 40's

Comments: _Relinquished samples directly to Bonner Laboratory

Signature: Spencer Trichell Date: 12/7/02

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
12/5/02	15:50	40 mL septa vials	HCl
		1L ambers	none

Geo-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-10
Site Location: Hattiesburg, Mississippi

Start Date: 12/4/02
Finish Date: 12/4/02
Sample Technician: Charles Coney
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 18.5
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 8.77
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): 1.5

Water Level Measurements		
Date	Time	Water Level (TOC)
12/4/02	10:18	9.73
	16:00	9.75
	16:11	20:24

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
12/5/02 16:14	0.25	5.34	50.1	19.8	37	0.84		slightly turbid at first
16:20	0.5	5.41	49.3	20.1	34	0.60		
16:25	0.75	5.39	47.3	19.7	23	0.62		
16:30	1.0	5.35	46.1	19.6	16	0.68		
16:35	1.25	5.39	45.6	19.5	12	0.74		

Sample Identification: MW-10

Weather Conditions During Sampling: raining, lower 60's

Comments: Samples relinquished directly to Bonner Laboratory

Signature: Spencer Trichell Date: 12/17/02

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
12/4/02	16:38	40 mL septa vials	HCl
		1L amber	none

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-4
Site Location: Hattiesburg, Mississippi

Start Date: 2/11/03 Finish Date: 2/11/03
Sample Technician: Spencer Trichell
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 18.5
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 8.36
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): 1.4

Water Level Measurements		
Date	Time	Water Level (TOC)
2/11/03	14:40	10.14

WELL DEVELOPMENT/PURGING DATA

Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
2/11/03 14:50	0.25	5.83	443.0	20.9	4.3	1.81		
14:55	0.4	5.82	443.0	21.5	4.8	0.90		
15:00	0.6	5.82	441.0	21.5	5.4	0.66		

Sample Identification: MW-4

Weather Conditions During Sampling: sunny, 60 F

Comments: _Delivered sample directly to Bonner Laboratory

Signature: Spencer Trichell Date: 2/14/03

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
2/11/03	15:00	40 mL septa vials	HCl

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: MW-9
Site Location: Hattiesburg, Mississippi

Start Date: 2/11/03
Finish Date: 2/11/03
Sample Technician: Spencer Trichell
Purge/Sample Method: Peristaltic Pump
Well Diameter: 2"
Total Depth of Well: 20
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 8.33
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): 1.4

Water Level Measurements		
Date	Time	Water Level (TOC)
2/11/03	15:52	11.67

WELL DEVELOPMENT/PURGING DATA

Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
2/11/03 16:05	0.25	5.65	448	20.3	9.2	0.50		
16:10	0.40	5.65	478	19.9	6.9	0.55		
16:15	0.60	5.66	791	19.8	6.5	0.53		

Sample Identification: MW-9

Weather Conditions During Sampling: sunny, 60 F

Comments: _Samples relinquished directly to Bonner Analytical

Signature: Spencer Trichell
Date: 2/14/03

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
2/11/03	16:15	40 mL septa vials	HCl

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: CM-1
Site Location: Hattiesburg, Mississippi

Start Date: 02/11/2003 Finish Date: 02/11/2003
Sample Technician: Spencer Trichell
Purge/Sample Method: Grab sample
Well Diameter: na
Total Depth of Well: na
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): na
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): na

Water Level Measurements		
Date	Time	Water Level (TOC)
na	na	na

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
02/11/2003 12:55		7.16	191.0	10.2	20	10.52		

Sample Identification: CM-1

Weather Conditions During Sampling: sunny, 60 F

Comments: _Delivered sample directly to Bonner Laboratory

Signature: Spencer Trichell Date: 4/4/03

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
02/11/2003	12:55	40 mL septa vials	HCl
		1L ambers	none
		8 oz. Glass	none
		8 cc syringe	none

Geo-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: CM-3
Site Location: Hattiesburg, Mississippi

Start Date: 02/11/2003 Finish Date: 02/11/2003
Sample Technician: Spencer Trichell
Purge/Sample Method: Grab sample
Well Diameter: na
Total Depth of Well: na
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): na
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): na

Water Level Measurements		
Date	Time	Water Level (TOC)
na	na	na

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
02/11/2003 11:15		6.81	183.0	8.3	24	10.77		

Sample Identification: CM-3

Weather Conditions During Sampling: sunny, 60 F

Comments: _Delivered sample directly to Bonner Laboratory

Signature: Spencer Trichell Date: 4/4/03

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
02/11/2003	11:15	40 mL septa vials	HCl
		1 L ambers	none
		8 oz glass	none
		3 cc syringe	none

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: Hercules
Project Number: HER99072
Boring ID: CM-5
Site Location: Hattiesburg, Mississippi

Start Date: 02/11/2003
Finish Date: 02/11/2003
Sample Technician: Spencer Trichell
Purge/Sample Method: Grab sample
Well Diameter: na
Total Depth of Well: na
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): na
Calculated Well Volume ($V=6hd^2$)
(V = vol in gal; D = well diam. in ft): na

Water Level Measurements		
Date	Time	Water Level (TOC)
na	na	na

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (umohs)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
02/11/2003 9:25		6.88	188.0	8.4	20.2	10.7		

Sample Identification: CM-5

Weather Conditions During Sampling: sunny, 60 F

Comments: _Delivered sample directly to Bonner Laboratory

Signature: Spencer Trichell Date: 4/4/03

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
02/11/2003	9:25	40 mL septa vials	HCl
		1 L amber	none
		8 oz. Glass	none
		3 cc syringe	none